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Indian Standard

CARBON BONDED SILICON CARBIDE CRUCIBLES — SPECIFICATION

(First Revision)

ICS 71.100.55

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 1997 **Price Group 1**

Refractories Sectional Committee, MTD 15

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Refractories Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first issued in 1989. While reviewing the standard in the light of experience gained during these years, the Committee decided to revise it to bring it in line with the present practices being followed by the Indian Industry.

In this revision, the following changes have been made :

a) Principal ingredients of carbon bonded silicon carbide crucibles given in Annex A are for guidance only.

b) Physical test requirements have been modified.

Crucibles are high refractory open mouthed vessels used for heating and melting various metals and alloys, such as copper, zinc, aluminium, brass, etc.

Generally crucibles are of clay bonded type or carbon bonded type. For carbon bonded crucibles, silicon carbide is used due to its high thermal conductivity and low coefficient expansion.

A good crucible is expected to have high refractoriness to withstand the working temperature, good density to cause no loss of content by absorption, resistance to corrosive actions of metallic oxides, slag ash, etc, and high cold crushing strength to hold the contents being carried (hot or cold).

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CARBON BONDED SILICON CARBIDE CRUCIBLES — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard covers the requirements of carbon bonded silicon carbide crucibles, which can be used up to 1 500°C.

1.2 Provisions of this standard shall not apply to crucibles for melting of steel.

2 REFERENCES

The Indian Standards given below are necessary adjuncts to this standard:

IS No.	*Title*
1387 : 1993	General requirements for the supply of metallurgical materials (*second revision*)
1528	Methods of sampling and physical tests for refractory materials
(Part 1) : 1980	Determination of pyrometric cone equivalent (PCE) and softening point (*second revision*)
(Part 5) : 1993	Determination of modulus of rupture (*second revision*)
(Part 8) : 1974	Determination of apparent porosity (*first revision*)
(Part 12) : 1974	Determination of bulk density (*first revision*)
1748 : 1981	Size of graphite crucibles (*first revision*)

3 SUPPLY OF MATERIALS

General requirements relating to the supply of carbon bonded silicon carbide crucibles shall be as laid down in IS 1387.

4 PRINCIPAL INGREDIENTS

Principal ingredients of carbon bonded silicon carbide crucibles are given, for guidance, in Annex A.

5 PHYSICAL TEST REQUIREMENTS

The crucibles when tested in accordance with the test methods specified shall conform to the requirements given in Table 1.

Table 1 Physical Test Requirements
(*Clauses* 5 *and* 8.1)

Sl No.	Characteristic	Requirement	Test Method (Ref to Part of IS 1528)
(1)	(2)	(3)	(4)
i)	Apparent porosity, percent, *Max*	30	Part 8
ii)	Bulk density, g/m^3, *Min*	1.8	Part 12
iii)	Pyrometric cone equivalent, standard cone (ASTM), Number, *Min*	28	Part 1
iv)	Modulus of rupture, *Min*	8.0	Part 5

NOTE — 1MPa = 1N/mm^2 = 1Mn/m^2 = 0.102 kgf/mm^2.

6 FREEDOM FROM DEFECTS

The crucibles shall be free from defects or cracks detrimental to its use.

7 SHAPE AND DIMENSIONS

Shape, dimensions and the tolerances on dimensions for carbide bonded silicon carbide crucibles shall comply with the requirements given in IS 1748.

8 SAMPLING

8.1 The tests shall be done by using cubes and bars as per relevant Indian Standard given in Table 1.

8.2 Representative samples of crucibles shall be drawn as agreed to between the manufacturer and the purchaser.

9 MARKING

9.1 Each crucible shall be legibly and indelibly marked with the following:

a) Manufacturer's name or trade-mark,

b) Size number (*see* IS 1748), and

c) Type.

9.2 BIS Certification Marking

The material may also be marked with the Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards*

Act, 1986 and the Rules and Regulations made thereunder. The details of the conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

10 PACKING

The crucible shall be suitably packed in hay/bamboo baskets or any other suitable packing material individually to avoid damage during transit.

ANNEX A

(*Foreword* and *Clause* 4)

A-1 Principal ingredients of carbon bonded silicon carbide crucibles should be generally as follows:

a) Silicon carbide — 35 percent, *Min*;

b) Graphite — 28 to 35 percent; and

c) Tar, pitch or any other carbon bonding material, such as resins, etc.

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